Determining Human or Non-Human Origin

1 Scope

This document describes guidelines for determining whether skeletal remains originate from a human or non-human (other animal) source by Anthropology Examiners within the Trace Evidence Unit (TEU).

2 Equipment/Materials/Reagents

- Sliding calipers capable of measuring items up to 200mm within +/- 0.5mm (Mitutoyo Digimatic Absolute Digital Calipers 500-172-20 CD-8”CX, or equivalent)
- Spreading calipers (digital or analog) capable of measuring items up to 300mm within +/- 0.5mm (Paleo-Tech Digital Linear Spreading Calipers with Mitutoyo Digimatic Absolute Digital Scale 572-213-10, or equivalent)
- Personal protective equipment (lab coat, gloves, eye protection or better, as needed)
- Stereobinocular microscope, magnification range from 0.5x to at least 40x
- Osteometric board (Paleo-Tech Field Osteometric Board, or equivalent)
- Tape measure
- Human and non-human skeletal reference casts
- Human and non-human skeletal reference material (e.g., museum collections)
- Sectioning/wafering saw (Isomet Precision Saw, or equivalent)

3 Standards and Controls

Not applicable.

4 Sampling

Not applicable.

5 Procedure

The Forensic Anthropological Examinations procedure will be followed. In cases where the examination requires the determination of whether skeletal material is human or non-human in origin, the following techniques may be used. In some cases, one of the following techniques may be sufficient, while others may require the use of multiple techniques to reach a conclusion. Observations supporting conclusions will be recorded in the case notes.

5.1 Procedures for Determining Human or Non-human Origin

5.1.1 The skeletal material will be evaluated by macroscopic visual examination to assess morphology, looking for features or landmarks that are characteristic of human or non-human species. The determination of whether material is human or non-human can usually be achieved by visual examination if the specimens are sufficiently large and in good condition, using the examiner's professional training and knowledge of human and non-human osteology. The presence of features or landmarks consistent with human skeletons supports the conclusion that the material is human in origin. The presence of features or landmarks that are not consistent with human skeletons, or that are consistent with non-human skeletons, supports the conclusion that the material is non-human in origin.

5.1.2 The skeletal material may be evaluated by quantitative assessment to determine whether it is within the known range of size variation of human skeletons. Measurements can be taken with calipers, an osteometric board, or a tape measure. The presence of size characteristics consistent with human skeletons supports the conclusion that material is human in origin. The presence of size characteristics that are not consistent with human skeletons or consistent with non-human skeletons supports the conclusion that the material is non-human in origin.

5.1.3 The skeletal material may be compared to information or data from published literature and/or skeletal exemplars including skeletal reference casts or skeletal reference material. Consistency of the material with human exemplars supports the conclusion that the material is human in origin. Inconsistency of the material with human exemplars or consistency with non-human exemplars supports the conclusion that the material is non-human in origin.

5.1.4 The microscopic structure of the skeletal material may be analyzed following the Bone Histomorphology procedure.

5.2 Reporting and Further Examinations

5.2.1 In the event that the remains are determined to be human, examinations will proceed according to the examination request following appropriate procedures.

5.2.2 In the event that the remains are determined to be non-human, this will be stated in the FBI *Laboratory Report* (7-1, 7-1 LIMS). When possible or appropriate, the origin(s) of the remains will also be stated. For example: "*The submitted item(s) is/are skeletal material of non-human origin. No further anthropological examinations were conducted*"

5.2.3 In the event that the remains are determined to be human and have been submitted only for DNA analysis, this will be stated in the *Laboratory Report*. For example "*The submitted item(s) is/are bones of human origin, and will be submitted to the DNA Casework Unit for analysis"*.

5.2.4 In the event that the examination is inconclusive, this will be stated in the *Laboratory Report*. For example "*The submitted item(s) is/are bone/tooth of undetermined origin. No further anthropological examinations were conducted*."

6 Calculations

Not applicable.

7 Measurement Uncertainty

7.1 The measurement uncertainty with calipers is approximately ± 0.02 mm or better, depending on the calipers used. Refer to instrument manuals for uncertainty for a particular caliper. This degree of measurement uncertainty does not significantly affect anthropological conclusions and is not detrimental to the results of anthropological examinations.

7.2 The measurement uncertainty with an osteometric board is approximately ± 0.5 mm. This degree of measurement uncertainty does not significantly affect anthropological conclusions and is not detrimental to the results of anthropological examinations.

8 Limitations

The conclusions that can be reached regarding human or non-human origin are dependent on the condition and completeness of the skeletal remains. Result based on fragmentary or poorly preserved material may inconclusive.

9 Safety

9.1 While working with physical evidence, laboratory personnel will wear at least the minimum appropriate protective attire (e.g., laboratory coat, safety glasses, protective gloves).

9.2 Universal precautions will be followed.

9.3 Exposure to biological and radiological hazards may be associated with the examination techniques performed. Safety procedures related to specific instruments or equipment (e.g., wafering saws, X-ray units) will be followed. Refer to the FBI Laboratory Safety Manual for guidance.

10 References

- Forensic Anthropological Examinations, Trace Evidence Procedures Manual (current version)
- Bone Histomorphology, Trace Evidence Procedures Manual (current version)
- FBI Laboratory Safety Manual (current version)
- Scientific Working Group for Forensic Anthropology guidelines for Determination of Medicolegal Significance from Suspected Osseous and

Dental Remains (current version).

Rev. #	Issue Date	History
1	02/07/2018	Updated throughout removing references to TEU where appropriate; added forensic anthropologists to the Scope in Section 1. Updated Section 2. Removed Section 4 Calibration and renumbered. Added 'or Sample Selection' to new Section 4 title. Updated wording in Sections 5 for clarity. Updated Sections 5.1.1 and 5.1.2 to replace bones with skeleton. Section 5.1.4 updated to reference Bone Histomorphology SOP. In Sections 5.2.2, 5.2.3, and 5.2.4 replaced report with Laboratory Report. In Section 5.2.3 also updated DNA unit. Updated Section 7. Updated references in Section 10.
2	02/10/2020	'Sample Selection' removed from Section 4 title. Added reference to non-human osteology to Section 5.1.1. Changed 'forensic anthropologist' to 'Anthropology Examiner' in Scope

Redacted - Signatures on File

Approval

Trace Evidence Unit Chief — Date: 02/07/2020

Anthropology Technical Leader — Date: 02/07/2020